CLAIMS OF THE INVENTION

WE CLAIM:

1. A system for performing a modification to a packet comprising:

a first memory configured to receive data comprising a portion of the packet;

one or more data modification units configured to received and modify the output of the first memory to create modified data;

a second memory configured to receive the modified data from the data modification unit.

2. The system of Claim 1, wherein the first memory and the second memory comprise registers.

3. The system of Claim 1, wherein the data modification unit comprises:

a control system configured to determine when to perform a modification on the data passing between the first memory and the second memory; and

logic configured to perform a modification on the data passing between the first memory and the second memory.

4. The system of Claim 3, wherein the control system includes a counter to determine an offset from the start of the packet at which the logic will perform a modification.

5. The system of Claim 1, wherein the modification comprises a modification to a time to live field, a type of service field, or a checksum field.

6. A system for modifying a portion of a packet comprising:

a first data storage having two or more storage locations;

a first set of one or more data selectors connected to received the output of at least one of the two or more storage locations;

one or more data modifiers connected to receive the output of at least one of the first set of one or more data selectors and configured to create modified data;

a second set of one or more data selectors connected to receive the modified output of at least one of the one or more modifiers; and

a second data storage having two or more storage locations and the second data storage is configured to store the output of at least one of the second set of one or more data selectors.

7. The system of Claim 6, wherein the first set of one or more data selectors is configured to direct the data from any one of the two or more storage locations of the first data storage to any of the one or more data modifiers and the second set of one or more data selectors is configured to direct the modified data to any of the two or more locations of the second data storage.

8. The system of Claim 6, wherein the first data storage and the second data storage comprises a four byte register and each storage location is one byte in size.

9. The system of Claim 6, wherein the data selectors comprise multiplexers.

10. The system of Claim 6, further including a control system configured to determine when the data modifiers modify the data received from the first set of one or more data selectors.

11. The system of Claim 10, wherein the control system is further configured to provide one or more data selector control signals to the first and second set of one or more data selectors to thereby control the routing of data to the data modifier and the two or more locations of the second data storage.

12. The system of Claim 6, wherein the one or more data modifiers perform modifications consisting of modification to a time to live value, a type of service value, or a checksum value.

13. A method for modifying data contained in one or more fields in a packet header or packet tag that is passing through a processing pipeline comprising:

selectively directing data to a modification unit;

selectively modifying the data based on control signals, the control signals determining when the modifiers will modify data;

outputting modified data from the modification unit to a subsequent portion of the processing pipeline.

14. The system of Claim 13, wherein the modification unit comprises hardwired logic configured to modify the data.

15. The system of Claim 13, wherein outputting modified data comprises providing the modified data to a register location.

16. The system of Claim 13, further including the step of providing control signals to the modification unit to control what modification the modification unit will perform.

17. The system of Claim 13, further comprising incrementing a counter, having an output, with the passage of data to the modification unit and providing the counter output to the modification unit to control when to perform a modification on data.

18. The method of Claim 13, wherein the method of modifying data may occur at any location in the packet.

19. A method for selectively modifying a portion of a packet as portions of the packet pass through a packet processing system:

analyzing the packet to determine processing instructions for the packet;

storing the processing instructions in a first memory;

loading a portion of a packet into a processing module;

providing control instructions to the processing module;

processing the portion of the packet with the processing module to create a modified portion of the packet;

outputting the modified portion from the processing module.

20. The method of Claim 19, wherein the processing modifies a portion of the portion of the packet.

21. The method of Claim 19, further including tracking the number of portions of the packet that have passed through the processing module to thereby control when the processing module will modify a portion of the packet.

22. The method of Claim 19, wherein storing the processing instructions in a first memory occurs at a location defined by a counter output.

23. The method of Claim 19, wherein the processing module performs time to live modification or type of service modification.

24. The method of Claim 19, further including sequentially passing a plurality of packet portions into the modify unit to generate a running summation of portion values to thereby generate a new checksum value.

25. The method of Claim 19, wherein outputting from the processing module comprises outputting the modified portion to one or more switches and further including; and

selectively switching the modified portion of the packet, wherein the switching may change the order of portions of the packet.